

## Claims

- [c1] 1.A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:  
generating at least one validated sequence of actions for at least one maintenance task;  
validating said at least one sequence in a virtual environment; and,  
delivering said at least one validated sequence for use in performing said at least one maintenance task.
- [c2] 2.The method of claim 1 wherein the delivering step comprises providing natural language instructions
- [c3] 3.The method of claim 2 wherein said natural language instructions comprises at least one of written instructions, voice instructions and animated exploded view video instructions.
- [c4] 4.The method of claim 1 wherein the generating step imports engineering data comprising a Computer Aided Design (CAD) model.
- [c5] 5.The method of claim 1 wherein the generating step comprises:  
importing said engineering data;  
determining mating interfaces of a plurality of component parts within a given assembly;  
creating at least one component part removal path for at least one of said component parts; and,  
generating said at least one sequence of instructions responsive to said creating step.
- [c6] 6.The method of claim 5 further comprising repeating said generating step to generate a plurality of sequences.
- [c7] 7.The method of claim 1 wherein said validating step is performed with a haptic interface.
- [c8] 8.A computer implemented method for enabling at least one of field service of machines and training of field service personnel comprising:

generating at least one sequence of actions for at least one maintenance task;  
 validating said at least one sequence can be performed by said field service  
 personnel; and,  
 delivering said at least one sequence for use in performing said at least one  
 maintenance task.

- [c9] 9.The method of claim 8 wherein the validating step provides feedback to the  
 generating step.
- [c10] 10.The method of claim 8 wherein the delivering step comprises providing  
 written instructions.
- [c11] 11.The method of claim 8 wherein the delivering step comprises providing  
 alternate instruction presentation such as voice instructions.
- [c12] 12.The method of claim 8 wherein the delivery step comprises providing  
 animated exploded view video instructions.
- [c13] 13.The method of claim 8 wherein the generating step imports engineering data  
 comprising a Computer Aided Design (CAD) model.
- [c14] 14.The method of claim 8 wherein said validating step is performed in a virtual  
 environment.
- [c15] 15.The method of claim 8 wherein said validating step is performed with a  
 haptics interface.
- [c16] 16.The method of claim 8 wherein the generating step comprises:  
 importing engineering data from a Computer Aided Design (CAD) model;  
 determining mating interfaces of a plurality of component parts within said CAD  
 model;  
 creating at least one component part removal path for at least one of said  
 component parts in a given exploded view; and,  
 generating said at least one sequence of instructions responsive to said creating  
 step.
- [c17] 17.The method of claim 16 further comprising repeating said generating step to

generate a plurality of sequences.

- [c18] 18.A system for enabling at least one of field service of machines and training of field service personnel comprising:
- an engineering data generating device adapted to compute and provide engineering data relating to said machines;
  - a service sequence generator adapted to import and process said engineering data to generate at least one sequence of instructions for at least one maintenance task;
  - an automated generating device adapted to convert said at least one sequence of instructions into natural language instructions for use in said at least one maintenance task;
  - a validating device adapted to verify said natural language instructions; and,
  - a delivery device adapted to deliver said natural language instructions to said field service personnel.
- [c19] 19.The system of claim 18 wherein said engineering data generating device is a Computer Aided Design (CAD) system and said engineering data comprises at least one of CAD models and engineering drawings.
- [c20] 20.The system of claim 18 wherein said automated generating device produces human-readable instructions for said maintenance tasks.
- [c21] 21.The system of claim 18 wherein said human-readable instructions comprise at least one of written instructions, voice instructions and animated exploded view video instructions.
- [c22] 22.The system of claim 18 wherein said validating device comprises a haptics device.
- [c23] 23.The system of claim 18 wherein said service sequence generator is further adapted to generate a plurality of collision-free part removal paths for said at least one sequence of instructions.
- [c24] 24.The system of clam 18 wherein said delivery device is further adapted to permit said service personnel to select a desired format for said instructions.

Variable	Mean	SD	Min	Max
Age	38.5	12.5	25	65
Gender	Male	Female		
Marital status	Married	Single		
Education	High school	College		
Occupation	Manager	Worker		
Income	Low	High		
Health status	Good	Poor		
Exercise frequency	Low	High		
Stress level	Low	High		
Sleep quality	Good	Poor		
Dietary habits	Healthy	Unhealthy		
Alcohol consumption	Low	High		
Tobacco use	Non-user	User		
Family size	Small	Large		
Work-life balance	Good	Poor		
Life satisfaction	High	Low		
Resilience	High	Low		
Emotional stability	High	Low		
Social support	High	Low		
Perceived stress	Low	High		
Coping strategies	Effective	Ineffective		
Life events	Low	High		
Healthcare access	Good	Poor		
Health insurance	Yes	No		
Medical history	None	Chronic		
Genetic factors	Low	High		
Environmental factors	Low	High		
Psychological factors	Low	High		
Behavioral factors	Low	High		
Physiological factors	Low	High		
Immunological factors	Low	High		
Metabolic factors	Low	High		
Cardiovascular factors	Low	High		
Respiratory factors	Low	High		
Gastrointestinal factors	Low	High		
Neurological factors	Low	High		
Musculoskeletal factors	Low	High		
Dermatological factors	Low	High		
Ophthalmological factors	Low	High		
Otorhinolaryngological factors	Low	High		
Urological factors	Low	High		
Gynecological factors	Low	High		
Pediatric factors	Low	High		
Geriatric factors	Low	High		
Neonatal factors	Low	High		
Perinatal factors	Low	High		
Maternal factors	Low	High		
Fetal factors	Low	High		
Placental factors	Low	High		
Amniotic factors	Low	High		
Uterine factors	Low	High		
Cervical factors	Low	High		
Vaginal factors	Low	High		
Perineal factors	Low	High		
Anal factors	Low	High		
Rectal factors	Low	High		
Colorectal factors	Low	High		
Gastrointestinal factors	Low	High		
Hepatic factors	Low	High		
Biliary factors	Low	High		
Renal factors	Low	High		
Endocrine factors	Low	High		
Reproductive factors	Low	High		
Immunological factors	Low	High		
Cardiovascular factors	Low	High		
Respiratory factors	Low	High		
Gastrointestinal factors	Low	High		
Neurological factors	Low	High		
Musculoskeletal factors	Low	High		
Dermatological factors	Low	High		
Ophthalmological factors	Low	High		
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Colorectal factors	Low	High		
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Hepatic factors	Low	High		
Biliary factors	Low	High		
Renal factors	Low	High		
Endocrine factors	Low	High		
Reproductive factors	Low	High		
Immunological factors	Low	High		
Cardiovascular factors	Low	High		
Respiratory factors	Low	High		
Gastrointestinal factors	Low	High		
Neurological factors	Low	High		
Musculoskeletal factors				